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Self versus other control and intrinsic motivation

by

John C. Pullyblank

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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Abstract

Eighty-nine subjects participated in a study designed to examine the effects on intrinsic motivation of self- versus other-control over a task. Both the time prior to beginning the task and the duration of the activity were either under the subjects' control or under one of two levels of experimenter control. The result desired was a continuum of control over the task from subject control over both components to clear experimenter control over both components. Intrinsic motivation for the task was predicted to decrease with increasing experimenter (external) control.

The results failed to produce any substantial support for the prediction. Though the specifics of control were clear to the subjects, there were no systematic effects on general perceived control or on levels of intrinsic motivation. It was suggested that the aspects of control were salient but not relevant to the subjects. As well, the instructions could have induced a competence set that was exacerbated by the presense of videotape equipment. In this case, the low levels of skill reported and observed with the task may have resulted in feelings of incompetence and thus in general attenuated intrinsic motivation.

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Table of Contents

Chapter		Page
I.	Introduction	1
II.	Method	9
	Subjects and design	9
	Materials	10
	Procedure	13
III.	Results	22
	Manipulation checks	23
	Behavioral measures	28
	Other measures	35
IV.	Discussion	42

***

Reference notes		48
References		49
Appendix A.	Questionnaire	52
Appendix B.	Tables of mean values	57
Appendix C.	ANOVA tables	69
Appendix D.	Raw data	82

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List of Tables

Table	Description	Page
1	Means for Questionnaire Item: "How much influence or control did you have over the amount of time you had alone prior to filming?"	25
2	Means for Questionnaire Item: "How much influence or control did you have over the amount of time you had for the activity during the videotaping?"	26
3	Means for Questionnaire Item: "Who decided how many minutes long the pretaping period was...?"	27
4	Means for Questionnaire Item: "Who decided how long the videotaping period would be...?"	29
5	Means for Concurrent Quality Measure	31
6	Mean Values for Free-play Trials Measure	32
7	Mean Values for Free-play Time Measure	34

University of Alberta

8 Means for Questionnaire Item: "How skillful did you feel you were at the activity?" 36

9 Means for Questionnaire Item: "How enjoyable did you find the Labyrinth game?" 37

10 Means for Bipolar Questionnaire Item: "Involved"(1)/"Uninvolved"(9) 39

11 Means for Bipolar Questionnaire Item: "Intrigued"(1)/"Not Intrigued"(9) 40

University of Alberta

There is an extensive body of literature focusing upon the effects of extrinsic demands on intrinsic interest (see Condry, 1977; Staw, 1976; and Deci, 1981 for relevant reviews). The phenomenon that receives some of the most intensive investigation is intrinsic interest in an activity can decline when extrinsic constraints are placed on task performance.

Within this literature, intrinsic interest is said to be displayed when an individual performs an activity solely for satisfaction provided by the activity itself (e.g., Enzle & Ross, 1978). Or in Deci's (1981) words: "Thus, we operationally define intrinsically motivated behaviors as those that are performed in the absense of any apparent external contingency" (p. 5). Extrinsic constraints that have been placed on such behaviors include rewards (e.g., Lepper, Greene & Nisbett, 1973; Condry, 1977), deadlines (e.g., Amabile, DeJong & Lepper, 1976) and surveillance (e.g., Pittman, Davey, Alafat, Wetherill & Kramer, 1980). However, the primary focus has been on the negative effect of extrinsic rewards on intrinsic motivation. The "overjustification" hypothesis consists of the specific proposition that an individual's intrinsic interest in an activity will decrease if the activity is engaged in to obtain extrinsic rewards (e.g., Lepper et al., 1973).

Self-perception explanations of the overjustification phenomenon state that to the extent that individuals are

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provided with salient, expected, rewards they will perceive their behavior as extrinsically motivated (Bem, 1972; Deci, 1981). Conversely, if the external contingencies are unexpected or insufficient to account for the individual's action, then the behavior will be attributed to their own dispositions, interests and desires. The rationale is that performance of an activity to obtain an extrinsic reward causes a change in the locus of self-perceived motivation from intrinsic factors to the extrinsic reward. Several studies have provided support for the hypothesis. Individuals who perform an activity to obtain extrinsic rewards subsequently show less interest in the task compared to individuals who receive the same rewards unexpectedly, receive trivially small rewards, or receive no rewards (e.g., Condry, 1977; Enzle & Ross, 1978; Lepper et al., 1973).

Deci (1975,1981) argues in his cognitive evaluation theory that there are two aspects or functions of any reward: the control of behavior, and the communication of information about an individual's competence. According to this theory, the control aspect of a reward becomes more salient when the person engages in an activity mainly to obtain an extrinsic reward. The result is decreased intrinsic interest in the task, or in other words, "overjustification". Several studies have shown that when the control aspect of a reward is made salient, by making the reward contingent solely on task engagement, intrinsic

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interest decreases (e.g., Lepper et al., 1973; Condry, 1977; Enzle & Ross, 1978; Boggiano & Ruble, 1979). Conversely, when the informational or competence aspect is made salient by making the reward contingent on meeting a performance criterion, intrinsic interest increases following receipt of the competence confirming reward (e.g., Enzle & Ross, 1978; Boggiano & Ruble, 1979; Pittman, Davey, Alafat, Wetherill, & Kramer, 1980; Rosenfield, Folger, & Adelman, 1980).

It is apparent that the overjustification effect can be viewed as occurring because individuals perceive themselves as being controlled by external restraints. This perception of external control can be exacerbated by the knowledge that the individual has submitted to the constraints by choice (Folger, Rosenfield, & Hays, 1978). In fact, some authors have posited that individuals have a desire to feel competent and self-determining, to be a causal force (Kun, Carfield, & Sipowicz, Note 3; Deci, 1975; White, 1958). From this viewpoint, the external constraint can be seen as undermining intrinsic interest by reducing the perception of self-determination (Amabile, DeJong, & Lepper, 1976; Zuckerman, Porac, Latkin, Smith & Deci, 1978). This view has led to the assumption that if the desire for self-determination is an important contributor to intrinsic motivation, activities over which individuals have greater self-determination should be more intrinsically motivating.

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It has been found that illusory or trivial control given to individuals over some aspect of their activities can lead to greater subsequent intrinsic interest than if people perceive themselves as having little control. For example, Enzle and Look (Note 1) have conducted a series of studies on the overjustification hypothesis in which some degree of control is given to the subject. These three studies are based on Bandura's (1976) model of self-reinforcement. Bandura (1976) argues that people can change their own behaviors by applying reinforcement procedures in the same manner as do external agents. Specifically, he states that self-reinforcement occurs when the individual establishes his or her own performance standards, determines the appropriate quantity of reward to be received upon meeting the standard, and finally, self-administers the reward.

In the first of the three studies conducted by Enzle and Look (Note 1), the standard setting aspect of the reinforcement contingency was controlled either by the experimenter (other-set) or the subject (self-set). Self-set standards were arrived at by allowing the subjects to select, from a limited range, the performance criteria they thought appropriate to the reward level. The second study manipulated other-set versus self-set levels of reward which were contingent upon meeting the fixed performance-standard. Finally, the third study manipulated self-delivery versus other-delivery of the reward. Findings from the three

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studies consistently showed that giving individuals control over some part of the reward contingency, or of reward delivery, prevented the emergence of the overjustification effects that were found when no control was given to the subjects. Enzle and Look (Note 1) concluded that the exercise of partial control was apparently sufficient to prevent the self-perception of extrinsic motivation and consequent loss of intrinsic interest.

These findings extend research by Zuckerman et al. (1978) in which subjects were simultaneously given the choice as to which tasks they performed and in what time spans, or were provided with no choice. They found that subjects given greater freedom of choice (self-determination) subsequently displayed greater intrinsic interest in the task than no-choice subjects.

Enzle (Note 2) has also collected data that focuses on the time span element of the Zuckerman et al. (1978) study. The data indicate that giving subjects control over the selection of a deadline eliminates the overjustification effect usually found when deadlines are employed (Amabile et al., 1976). Not only is this effect demonstrated with selection of overall deadlines, but as well with selection of subdeadlines (allocation of time to components of the task) within an overall deadline. An additional finding in these studies is that even giving subjects the possibility of choosing a more stringent deadline attenuates the

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overjustification effect. Again, it appears that minimal control given to the subject over the experimental situation reduces the amount of extrinsic control perceived.

To summarize, it has been found that subjects who are given control over (a) the choice of activity, (b) the amount of reward to be received for completion of a task, (c) the performance criteria to be met in order to receive a reward, (d) delivery of the reward, or (e) the setting of deadlines or subdeadlines for completion of the task, do not interpret their behavior as extrinsically controlled. The result is an elimination of the overjustification effect, or in some cases, an increase in intrinsic motivation.

The intent of the present study was to extend previous findings that have shown that intrinsic interest in a task can be maintained or enhanced as a result of increased subject control over the experimental task selected. In the natural setting, there are a number of factors that may or may not be self-determined (for example, when to begin work and how long to work each day). This research was specifically designed to examine the effects of self- versus other- control over the delay just prior to beginning the task, and the actual duration of the task activity. These time dimensions were meant to correspond respectively to (a) when a person undertakes to begin an activity, and (b) how long a person then spends engaged in the activity. There were three levels of control for each of the two task

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characteristics. The levels were: (a) self-control, (b) other-control (low salience), and (c) other- control (high salience). In crossing the three levels of control over initiation time with the three levels of control over task duration, a continuum ranging from extrinsic control to self-determination was expected to be achieved. At one end of the continuum the subject was given a choice from a range of values (times) for each of the two task characteristics. In the middle of the continuum, no mention was made to the subject of alternatives existing for either of the task characteristics. At the other end of the continuum, it was made clear to the subject (high salience) that both of the task characteristics were under extrinsic control. As the amount of extrinsic control varied across the nine conditions of the experiment, it was predicted that intrinsic motivation would correspondingly vary. Levels of intrinsic interest (measured by free play) were expected to be highest in the condition where the subjects were given control over both task characteristics. It was predicted that intrinsic motivation would decrease as one or both of the task characteristics were placed under external control. Finally, of all the nine conditions, the condition in which both task characteristics (initiation time and task duration) were under highly salient extrinsic control was expected to show the lowest levels of post-task intrinsic motivation. Thus, a continuum of decreasing intrinsic motivation (increasing overjustification) was proposed to

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accompany the continuum of increasing extrinsic control.

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Method

Subjects and Design

Subjects were 107 female undergraduate students from the University of Alberta, participating in partial fulfillment of course requirements. They were randomly assigned to conditions.

The design for this research was a 3 X 3 factorial in which determination of activity initiation time was crossed by determination of task performance duration. Within both the factors of initiation time (or delay until initiation) and task duration there were three levels of control. Firstly, there was a self-determined level in which the subject was given illusory control over a range of initiation times or task durations. Secondly, there was an other-determination (low salience) condition in which time of task initiation or duration was externally determined, but for which no range of alternative times was mentioned to the subject. Finally, there was an other determination (high salience) level in which it was made clear to the subject that the time of initiation or duration of the task had been explicitly selected by the experimenter from a range of alternatives. With the crossing of the two factors, there was a cell in which both time of initiation and task duration were: (a) "selected" by the subject; (b) provided by the experimenter without mention of alternatives; (c) "selected" by the experimenter; and six cells containing

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mixtures of self and other (both low and high salience) determination of delay until initiation and of task duration.

Materials

Materials used for the experiment consisted of videotape equipment, a Labyrinth game, a switch-light system, timers, a taperecorder, and a questionnaire.

The videotape equipment consisted of a video-camera placed in front of and above the subject. This camera was pointed down at the subject's hands and was connected to a remotely-controlled reel-to-reel videorecorder. This equipment actually functioned and made a usable tape (for realism) but was employed only as part of the cover story. The tapes were not subsequently used and each session was taped over the preceding session.

The Labyrinth game consists of a square wooden box, with a surface that can be simultaneously tilted in side-to-side and front-to-back motions (via knobs on the front and side, respectively). On the (moveable) top of the game there are several holes connected by a painted line and surrounded by several small "walls". In total, the top forms a maze and the goal of the game is to move a steel ball as far as possible along the line (by tilting the top) without allowing it to fall through one of the holes. For the purpose of the present study, a correct trial was defined as one during which the subject placed the ball at the "start"

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position and followed the line in the appropriate direction.

During the periods in which the subject played with the Labyrinth game, she was observed through a one-way glass system. Behind the camera that was in front of the subject, there was a bulletin board on which were placed notes and memos relevant to the experiment. This bulletin board concealed a window through which the experimenter could observe the Labyrinth game and the subject's hands (by looking through both the window and the weave of the bulletin board fabric) from another room. The distance achieved on each trial was scored with a standardized system of numbered holes.

Electrical switches were present to make the subject's choice(s), or lack thereof, salient. The switches were on two small rectangular gray boxes. Each box had three toggle switches placed lengthwise on one surface of the box. These two boxes were affixed to each other back-to-back by the sides opposite to those with the switches. Because the two boxes were attached back-to-back, when one bank of switches was facing the subject, the other bank of three switches was on the back of the attached boxes and pointing away from the subject. As a result, the subject could only see the front bank of switches unless the attached boxes were flipped over by her to expose the other side. One bank of three switches was labelled "Pretape" with the individual switches labelled "A", "B", and "C". The other bank of three switches was

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labelled "Taping" with the individual switches labelled "X", "Y", and "Z". These labels were irrelevant to the subjects unless their condition required instructions explaining them. When this was the case it was explained that Pretape referred to the pretaping period just prior to filming, with A signifying a 2 minute duration; B a 4 minute duration; and C an 8 minute duration. Where necesary, "Taping" was explained as referring to the length of videotaping, with X signifying a 5 minute duration; Y a 10 minute; and Z a 15 minute duration. There were wires running from all switches to a box in the main lab that had two rows of three lights (one row of lights per bank of switches). These lights illuminated when their corresponding switch was operated and allowed the experimenter to know if the subject made any changes to the switches.

A taperecorder was used during the periods of observation to record the distance achieved by the subject on each trial. During these periods the experimenter observing play with the Labyrinth game scored each trial by turning on the tape-recorder (with the switch on the microphone hanging around his neck), saying the number of the hole the ball had just fallen into (distance), and turning off the recorder. This procedure allowed the experimenter to continuously keep his eyes on the subject's play with the Labyrinth and score the play simultaneously. At the conclusion of each experimental session, the tape was played back and a written record was made of the distance

University of Alberta

scores and total number of (appropriate) trials. Timers were also employed to regulate the duration of segments of the experiment as well as to keep a record of cumulative time in contact with the toy during the free-play portion of the study.

The questionnaire (see Appendix A) consisted of seventeen items with nine-point scales for responses and two either/or items for a total of nineteen items. These items probed for interest and enjoyment, perceived skill, perceived control, and the general effectiveness of the manipulations.

Procedure

The subject was told that there were two parts to the present experiment. Since the first part involved videotape equipment that had to be returned shortly to another experiment, the subject was told, the part involving it would be completed first.

The experiment was presented as a means to obtain videotapes of adults playing with toys. These videotapes were supposedly a means for children, upon subsequent viewing, to vicariously learn the most efficient strategies by which to play with the particular toy (in this case, the Labyrinth game). At this point, the experimenter demonstrated the correct means by which to use the toy; repeatedly placing the steel ball at the start position and moving it as far as possible through the maze without

University of Alberta

dropping it through a hole.

Next, the experimenter informed the subject that he was going into the other room to check that everything was ready for taping. The experimenter instructed that while he was gone he wanted the subject to read additional instructions. He then provided her with an envelope containing them. The experimenter asked the subject to knock on a specified door when finished and then departed through that door.

The instructions in the envelope provided the various experimental manipulations. In all conditions the instructions began with the following:

> We would like to make it clear to you that the videotapes that result from the filming sessions are used solely for research purposes. In this context, all we film is the Labyrinth game and your hands; nothing else shows in the final result. Thus, the collection of tapes we end up with are completely anonymous.

This paragraph was followed by a dotted line and then the actual manipulations. The delay until initiation (or Pretaping) manipulation was always first. In the case of self-controlled pretape, the subjects read:

> Everyone in this study who is asked to make a videotape for use with children will be given some time prior to the start of the videotaping during

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which to think of ways to best demonstrate the use of the toy. There is a range of pretaping times during which people can formulate a plan. This pretaping time will begin when the experimenter tells you to "start". This period will be either 2 minutes, 4 minutes or 8 minutes. The standard setting is 2 minutes, and the equipment is currently set up for this pretaping period. However, if you desire, you can select one of the two other pretaping periods (4 or 8 minutes), and the experimenter in the other room will recalibrate the apparatus to make the appropriate changes to the equipment before giving you the "start" signal. Right now, please take a look at the small gray metal box to your left on the table top labelled "PRETAPE". Switch A stands for 2 minutes, switch B stands for 4 minutes and switch C stands for 8 minutes. If you wish to choose the standard 2 minute pretaping period, you need do nothing. If you wish to communicate to the experimenter that he should recalibrate the equipment, please flick the B switch (for 4 minutes of pretaping time) or switch C (for 8 minutes of pretaping time). Please make your decision right now.

This paragraph gave the subject the appearance of a choice but made a subtle demand to leave the switches set at 2

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minutes of pretaping time. For subjects in conditions where the pretaping was other-controlled (high salience) the first paragraph after the common introduction read:

> Everyone in this study who is asked to make a videotape for use with children will be given some time prior to the start of the videotaping during which to think of ways to best demonstrate the use of the toy. There is a range of pretaping times during which people can formulate a plan. This pretaping time will begin when the experimenter tells you to "start". This period will be either 2 minutes, 4 minutes or 8 minutes. Right now, please take a look at the small gray metal box to your left on the table top labelled "PRETAPE". Switch A stands for 2 minutes, switch B stands for 4 minutes and switch C stands for 8 minutes. As you can see, the 2 minute pretape time (A) has been selected for you.

Again, the alternatives were presented but it was made clear that it was the experimenter who had chosen the present setting of 2 minutes. Finally, for subjects in conditions where the pretaping duration was other-controlled (low salience) there was no paragraph making any mention of the pretaping duration.

The taping duration manipulation was next. In the case of self-controlled taping duration the subjects

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read: (words in brackets represent additions made when this paragraph followed a pretaping paragraph)

(As well,) We have found that children of different ages have somewhat different attention spans. In most cases, 5 minutes seems to be about the proper length of time. However, it is useful in some instances to have somewhat longer tapes. We are therefore making tapes that show an adult playing for 5 minutes, and some other tapes that show an adult playing for either 10 minutes or for 15 minutes. The standard setting for the time control on our videotape equipment is 5 minutes, but can be changed to one of the other alternatives. Right now, please take a look at the small gray metal box to your left on the table top labelled "TAPING". (or: Please turn the gray box on the table to your left over so you can see the back side. This side of the box is labelled "TAPING".) Switch X stands for 5 minutes, switch Y stands for 10 minutes and switch Z stands for 15 minutes. If you wish to choose the standard 5 minute taping duration, you need do nothing more and videotaping will last for 5 minutes. If you would like to communicate to your experimenter that he should change the timing equipment for a 10 minute taping duration, please flick the Y switch and if you wish to change to the 15 minute

University of Alberta

taping duration please flick the Z switch. Please make this decision now.

Again, alternatives were presented but subtle demands existed for the subject to leave the switches set at 5 minutes. In the other-controlled (high salience) conditions the subjects read:

> (As well,) We have found that children of different ages have somewhat different attention spans. In most cases, 5 minutes seems to be about the proper length of time. However, it is useful in some instances to have somewhat longer tapes. We are therefore making tapes that show an adult playing for 5 minutes, and some other tapes that show an adult playing for either 10 minutes or for 15 minutes. Right now, please take a look at the small gray metal box to your left on the table top labelled "TAPING". (or: Please turn the gray box on the table to your left over so you can see the back side. This side of the box is labelled "TAPING".) Switch X stands for 5 minutes, switch Y stands for 10 minutes and switch Z stands for 15 minutes. As you can see, the 5 minute taping duration (X) has been selected for you.

Here the alternatives were presented and it was made clear that the experimenter had selected the 5 minute setting for the subject. Finally, in the case of other-controlled (low salience) taping duration, there was no paragraph making any

University of Alberta

mention of the taping duration.

The switches referred to were always present with only one side of the box, and thus one bank of switches, visible to the subject. In seven of nine conditons the side labelled "Pretape" with switches labelled A, B, and C faced the subject. In conditions where the subject had to see the other side, the instructions indicated that it existed and told the subject how to view it (see above instructions). In the condition that made no mention of either pretape or taping alternatives the box still existed with the pretaping side forward but no explanation was offered and the term "pretaping" was never encountered. In two of the nine conditions the taping switches were the only ones visible.

Thus, subjects in the condition where both pretaping and taping durations where other-controlled (low salience) received instructions with only the common introductory paragraph and the final instructions to return the instructions to the envelope when finished. Subjects in conditions where one of the durations was other-controlled (low salience) received instructions with the common first paragraph and one other paragraph. Finally, subjects in conditions where neither of the durations was low salience received instructions with two paragraphs. These instructions in fact led nearly all self-choice subjects to acquiesce to the 2 minute pretaping period and/or the 5 minute taping period. Delivery of the above written

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instructions was designed to keep the experimenter/observer blind to the subject's condition (the experimenter did not know the contents of the envelope until observation was completed).

When the subject indicated that she was finished by knocking on the door, the experimenter re-entered the room. The experimenter then stated that the task would begin in two minutes and continue for five. It was explained that when the subject heard the videotape start that she should begin the task and discontinue the task upon hearing the videotape stop (the stopping and starting sounds were demonstrated).

After the demonstration and explanation, the experimenter left the room, timed two minutes, and started the videorecorder with the remote control. During the duration of the initial five minute play period, the subject was observed through a one-way glass system. Quality measures in the form of number of trials initiated and distance achieved on the game were taken at this time.

At the end of the five minute period, the experimenter stopped the videotape player (remotely) and re-entered the room. He stated that it was now time to return the borrowed equipment and that he would be back with a questionnaire for the second portion of the experiment. The experimenter then exited, with the equipment, through a door into the main hallway.

University of Alberta

After exiting through the side door, the experimenter re-entered the main lab adjoining the subject's lab and began observing the subject. Three measures were taken at this time: 1) number of trials correctly initiated (where correctly meant starting the steel ball at the starting point and following the line, as originally instructed); 2) distance achieved on each correctly initiated trial; and 3) total contact with the toy or total free play (defined as any manipulation of the movable top table of the game).

At the end of the ten minute free-play period the experimenter came back into the room and gave the subject a questionnaire and instructions to knock on the door when she had completed it. This questionnaire probed for perceived control, perceived extrinsic demands, and contained a selection of attitudinal measures of liking for the toy. When the questionnaire was completed, the subject was probed for suspiciousness, fully debriefed and dismissed.

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Results

Of the original 107 subjects, 18 (16.82%) were not included in analyses for the following reasons: (a) alternate switch selections in choice conditions (6 subjects)[1]; and (b) suspiciousness (12 subjects). Analyses were performed on the remaining 89 subjects (10 per cell, except one cell with 9). All discards other than for reason (a) were unrelated to condition assignment.

A series of three multivariate analyses of variance (MANOVA) were carried out on the dependent measures of intrinsic interest. It was reasoned that a grouping of the primary dependent measures as a whole, a grouping of the behavioral free-play measures, and a grouping of eight relevant questionnaire measures (How interesting?, How enjoyable?, To what extent would you play with the game in the future?, and the five bipolar questions) should each yield correlated results. For example, the behavioral free-play measures should each go in the same direction and as a whole follow a similar trend (as indicated by the MANOVA). The MANOVAs failed to yield significant effects for the overall grouping (free-play behavioral, and eight questionnaire items): interaction, Man F (44,292)=1.04, p

[1]None of the five cells where alternate switch selections were possible were over-represented among the six subjects.

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>.05[2]; taping factor, Man F <1; pretaping factor, Man F (22,142)=1.09, p >.05. MANOVA also failed to yield significant effects for the grouping of behavioral measures: interaction, Man F (12,206.66)=1.25, p >.05; taping factor, Man F <1; pretaping factor, Man F <1. Lastly, MANOVA failed to yield significant efffects for the grouping of attitudinal items: interaction, Man F <1; taping factor, Man F (16,144)=1.33, p >.05; pretaping factor, Man F (16,148)=1.33, p >.05. In the following sections, all F values refer to the results of univariate 3 X 3 ANOVAs conducted on the individual dependent measures.

Manipulation checks.[3] A series of seven items on the questionnaire was designed to check if the control manipulations were salient to the subjects. Three items that asked how much general control the subjects felt they had failed to yield significant differences. However, four items that asked specifically about the amount of control over the pretaping and taping durations produced highly significant results. The item "How much influence or control did you have over the amount of time you had alone prior to filming?" produced the expected main effect for pretaping

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[2]All MANOVAs were calculated according to the Pillais, Hotellings and Wilks criteria. Reported MANOVA F values and degrees of freedom reported are those calculated by the criteria that yielded the largest F.

[3]Summaries of condition means and ANOVA not reported in text appear in Appendices B and C respectively.

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duration, F (2,80)=8.82, p <.01. Table 1 shows the means for the three levels of the pretaping factor (the item was on a 9-point scale). It can be seen that the amount of perceived control decreases with increasing external control. A Newman-Keuls analysis revealed that the only significant difference was that between the self conditions and the two other conditions.

The item "How much influence or control did you have over the amount of time you had for the activity during the videotaping?" produced the expected main effect for the factor of taping duration, F (2,80)=29.57, p <.01. Table 2 shows the means for the three levels of the taping factor. As with the previous item, the mean ratings show the same decrease from self to other(high salience), with Newman-Keuls analyses showing only the self-other difference as significant.

In addition to the two 9-point scale items, there were two questions that directly asked who was responsible for setting the pretaping/taping duration. The item "Who decided how many minutes long the pretaping period was ...?" yielded a significant pretape effect, F (2,80)=73.05, p <.01. Table 3 shows the means for this factor (0=you; 1=the experimenter). It is clear that the majority of the subjects perceived correctly who had set the pretaping duration, with Newman-Keuls analysis showing a significant self-other difference.

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Table 1

Means for Questionnaire Item: "How much influence or control did you have over the amount of time you had alone prior to filming?"

Pretape Effect

Self	Other(low)	Other(high)
5.400	3.414*	2.667*

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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Table 2

Means for Questionnaire Item: "How much influence or control did you have over the amount of time you had for the activity during the videotaping?"

Taping Effect		
Self	Other(low)	Other(high)
6.500	3.233*	2.241*

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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Table 3

Means for Questionnaire Item: "Who decided how many minutes long the pretaping period was...?"

Pretape Effect		
Self	Other(low)	Other(high)
.100	.931*	.900*

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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As well, the item "Who decided how long the videotaping period would be?" produced a significant taping effect, F (2,80)=58.58, p <.01. The lower portion of Table 4 shows the means from this factor and the significant self-other difference. However, this item also yielded a significant pretape effect, F (2,80)=4.506, p <.05. As can be seen from the upper portion of Table 4, only the self and other(high salience) means differed significantly. The main contribution to this effect are the self pretape/other duration(low salience) and self pretape/other duration(high salience) conditions. In both cells, a number of subjects selected themselves as in control of the taping duration. Thus subject control over pretaping appeared to have some effect over perceived locus of control over taping duration.

In general, it appears that the control manipulations in the written instructions were salient to the subjects. As well, the low number of discarded subjects due to alternate switch selections indicates that though the existence of choice was salient, the subtle demands not to change the switches were effective as well.

Behavioral measures.[4] Two behavioral measures were taken during the initial (concurrent) play period: 1) number of trials; and 2) mean distance achieved over all

[4]Summaries of condition means and ANOVA not reported in text appear in Appendices B and C respectively.

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Table 4

Means for Questionnaire Item: "Who decided how long the videotaping period would be...?"

Pretape Effect

Self	Other(low)	Other(high)
.533*	.690*#	.767#

Taping Effect

Self	Other(low)	Other(high)
.167	.933*	.897*

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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trials. The concurrent trials measure produced a range of cell means from 22.20 to 25.90 but no significant effects. The concurrent quality (distance) measure yielded a main effect for pretaping, F (2,80)=3.94, p <.05. Table 5 shows the pretape means and Newman-Keul results. This is not a predicted result. However, these means and indeed the entire range of means (1.862 to 2.351), are at the low end of the quality scale (averaging within the first three holes of the game).

Three behavioral measures were taken during the free-play period: 1) total correct trials; 2) mean quality (distance) over all correct trials; and 3) total free-play time (in seconds). The measure of free-play trials did not produce the expected main effects but did yield a significant interaction, F (2,80)=2.64, p <.05. Table 6 shows the cell means. There were no significant between-cell contrasts for the Newman-Keul analyses, however the means show some interesting trends. First, the self pretape/self duration cell has the highest mean. The other pretape(low salience)/other duration(low salience) mean is second highest but the cells in which only one factor is other(low salience) are quite low (especially when an other(low salience) factor is combined with a self factor; yielding the two lowest means). Of all the means with other(high salience) factors, the one in which both factors are other(high salience) yielded the lowest cell mean.

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Table 5

Means for Concurrent Quality Measure

Pretape Effect

Self	Other(low)	Other(high)
1.999*	2.297	2.067*

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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Table 6

Mean Values for Free-play Trials Measure

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	25.000	6.500	12.000	(14.500)
Other(low)	4.900	20.100	16.000	(13.586)
Other(high)	15.000	10.500	9.900	(11.800)
(Total)	(14.967)	(12.367)	(12.517)	

Note. Means for main effects appear in columns and rows within parentheses.

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The behavioral measure of free-play quality produced no significant differences. However, the range of cell means (1.142 to 2.037) was again very low.

The final free-play measure of free-play time failed to yield any significant differences, including the expected main effects. However, some interesting trends can be noted. Table 7 shows the column and cell means for this measure. Firstly, the column means for both the pretaping and taping factors decrease in the predicted direction (decreasing free-play with increasing external demands). Cell mean trends are similar to those found on the measure of free-play trials. Again, the self pretape/self duration mean is clearly the highest with the other pretape(low salience)/other duration(low salience) mean second highest. Combinations involving an other(low salience) factor produced the three lowest means (those for the other pretape(low salience)/self duration, self pretape/other duration(low salience), and other pretape(high salience)/other duration(low salience) cells). Except for the other pretape(high salience)/other duration(low salience) mean, the other pretape(high salience)/other duration(high salience) cell yielded the lowest mean of all cells with an other(high salience) factor.

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Table 7

Mean Values for Free-play Time Measure

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	365.500	170.200	200.200	(245.300)
Other(low)	113.200	278.700	208.444	(199.828)
Other(high)	210.500	169.300	176.000	(185.267)
(Total)	(229.733)	(206.067)	(194.414)	

Note. Means for main effects appear in columns and rows within parentheses.

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Other measures.[5] The questionnaire contained a series of questions that inquired about the subject's feelings toward the game. Two items inquired about feelings of skill. The item: "How skillful did you feel you were at the activity?" (from 1 (not at all) to 9 (very much)) yielded a range of cell means (1.90 to 3.30) all within the "Not at all" range with a significant pretape effect, F (2,80)=3.21, p <.05. However, a Newman-Keuls analysis failed to show any significant differences between means (see Table 8). The second skill item: "How satisfied are you with your activity during the videotaping?" produced no significant differences but the range of cell means (2.30 to 4.70) are all within the "Not very satisfied" range.

Four additional nine-point scale questions asked about how interesting and enjoyable the subjects found the game. Of these, two failed to produce informative results. Of the two remaining, the item: "To what extent did you find the Labyrinth game interesting?" yielded no significant differences but the range of cell means (5.50 to 7.78) were all within the "Very much" range. The second item: "How enjoyable did you find the Labyrinth game?" yielded a range of cell means in the middle to "Very much" range (5.00 to 8.00) and a significant pretape effect, F (2,80)=3.75, p <.05. Table 9 shows the means for the pretape factor and the

[5]Summaries of condition means and ANOVA not reported in text appear in Appendices B and C respectively.

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Table 8

Means for Questionnaire Item: "How skillful did you feel you were at the activity?"

Pretape Effect		
Self	Other(low)	Other(high)
2.867*	2.759*	2.067*

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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Table 9

Means for Questionnaire Item: "How enjoyable did you find the Labyrinth game?"

Pretape Effect

Self		Other(low)	Other(high)
6.000*#	—	7.000*	5.667#

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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results of the Newman-Keuls analysis. This shows results inconsistent with the predictions of the study.

Five bipolar items (e.g. "Interested"(1) to "Uninterested"(9)) also measured interest and enjoyment. Of these, one item failed to yield informative results. Of the remaining four items, the item: "Interested"/"Uninterested" failed to yield significant results but produced a range of cell means (2.22 to 4.90) within the "Interested" half of the range. The item: "Involved"/"Uninvolved" yielded both a significant pretape effect, F (2,80)=3.36, p <.05, and a significant taping effect, F (2,80)=4.50, p <.05. Table 10 shows the means for both of these factors as well as the results of Newman-Keuls analyses. All means are within the "Involved" range. For the pretape factor, only the other pretape(low salience)/other duration(high salience) difference is significant with other(high salience) cells being the least involved. In the case of the taping factor, the other(low salience) level is the least involved and is significantly different from both other levels. In general, then, the pattern of results for this item are not consistent within themselves or with the predictions of the study. The item: "Intrigued"/"Not intrigued" yielded a significant taping effect, F (2,80)=3.48, p <.05. Table 11 shows the means and Newman-Keuls analysis for his factor. Again, although the self pretape/other duration(low salience) difference was predicted, the placement of the other(high salience) level was not. The final bipolar

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Table 10

Means for Bipolar Questionnaire Item:
"Involved"(1)/"Uninvolved"(9)

Pretape Effect

Self	Other(low)	Other(high)
3.333*#	2.862*	4.300#

Taping Effect

Self	Other(low)	Other(high)
2.767*	4.433	3.310*

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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Table 11

Means for Bipolar Questionnaire Item:
"Intrigued"(1)/"Not Intrigued"(9)

Taping Effect		
Self	Other(low)	Other(high)
3.267*	4.567#	3.586*#

Note. Means that do not differ at the .05 level by the Newman-Keuls analysis share a common symbol.

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item: "Bored"/"Not bored" failed to yield significant differences but produced a range of cell means (6.00 to 8.22) within the "Not bored" portion of the range. Finally, the questionnaire item: "How much experience have you had with this activity prior to the session today?" yielded no significant differences and a range of cell means (1.10 to 2.20) close to the "Not at all" end of the scale. This indicates that the subjects did not differ in the amount of experience they had had with the game (having on the whole, very little).

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Discussion

The intent of this study was to create for the subjects a continuum of choice over two task characteristics (length of delay prior to videotaping and duration of videotaping). This range of choice was from having no control over either of the task characteristics to apparently having control over both characteristics. It was predicted that more choice or control would lead to higher levels of measured intrinsic interest and less control would result in decreased measures of intrinsic interest. As a whole, then, it was predicted that a continuum of decreasing intrinsic motivation would accompany the continuum of increasing extrinsic control.

The results provided no substantial indications of a systematic change in measured intrinsic motivation accompaning changes in the amount of control (over the two task characteristics) given to the subjects. Indeed, both the behavioral and the questionnaire measures failed to indicate even any reliable predicted self-other differences. For the behavioral measures in particular, although differences between the cell means appear large, the variability within the cells was so large that none of the differences between levels of each factor (corresponding to each task characteristic) or between cells achieved statistical significance.

However, the manipulation of perceived control was implemented successfully to a degree. Manipulation checks

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did indicate that subjects across conditions were, on the whole, aware of who was in control of each of the two task characteristics even though the perceived levels of general control over the experimental situation did not differ between conditions. Measures of enjoyment and interest in the Labyrinth game also did not indicate any of the predicted differences between groups but did indicate that, across the study, subjects found the task enjoyable, interesting, involving, and not boring.

As mentioned in the previous section, the two most important (behavioral) measures in the study, free-play trials and free-play time, yielded some interesting trends. In both cases, the cell in which the subject had control over both task characteristics showed the highest amount of interest (free-play). When one or both of these measures were placed under external control, both measures showed decreases (see Tables 6 and 7). In terms of the column means for free-play time, the decrease in measured interest from self-controlled to other-controlled (low salience) to other-controlled (high salience) that was predicted was demonstrated for both factors (again, however, without benefit of statistical significance). Thus, there were indications of decreasing intrinsic motivation with increases in external control even though they are unreliable and statistically nonsignificant.

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The interesting question, of course, is why the experiment failed to reliably confirm its predictions. One possible reason for the lack of findings is the exact nature of the control over the experimental situation that was perceived by the subjects. It is clear from the manipulation checks that participants generally understood whether they did or did not have control over the pretaping or taping durations. However, items on the questionnaire that asked about general control (e.g. "In general, to what extent did you feel yourself to be in control of things during the videotaping?) failed to indicate any differences between conditions. It is plausible, then, that the control given to (or not given to) the subjects in this study was salient but not relevant to them. The subjects perceived who was in control of the two task characteristics but did not, as a whole, consider having or not having control over these two aspects of the experimental situation as particularly relevant to their general level of control over the task. The possibility that subjects may have differed in the amount of relevance they placed on these task characteristics could account for the large amount of within-cell variability.

However, it is important to make a clear distinction here. In this study, it is conceivable that as a result of an "oversell" of the cover story, subjects saw themselves as having control over aspects of the videotaping, not as having control over starting and stopping the task. In other

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words, the "pretape" and "taping" durations could have become reified without being seen as representative of the general task situation. Thus, subjects focused on the operationalizations (pretape, taping) of the concepts (starting and stopping the task) and found control (or lack of control) over them as not being particularly relevant to control over thier activity perse. It is highly likely that deciding when to start a task and deciding how long to perform it are highly relevant to most people. If control over these elements could be perceived, intrinsic motivation could be affected in the manner originally hypothesized.

The nature of the feelings expressed about the Labyrinth game suggests a further reason for the unpredicted results. On the whole, responses on the questionnaire indicated that subjects found the task both interesting and enjoyable. However, measures also indicated that the game was difficult and that the subjects thought that they were not very competent at it. The behavioral measures of quality stayed uniformly low across all subjects. More importantly, questionnaire items that probed for how skillful the subjects felt, or how satisfied they were with their performance, yielded uniformly low scores (meaning they did not feel skillful) across <u>all</u> conditions. Thus, although the subjects reported liking the game they also clearly reported that they did not feel competent at it. Deci (1981) states that perceiving oneself as incompetent at some activity can decrease intrinsic motivation for that activity. It appears

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possible, then that the Labyrinth game task created a conflict. Subjects enjoyed the task but were unable to succeed at it. The resulting feelings of imcompetence may have attenuated any effects due to liking, and as a result, the expected findings as well.

The issue of competence is quite possibly larger than the subject's inability to succeed at the Labyrinth task. Within the cover story, subjects were told that during the pretaping duration they were to think of the best way to demonstrate the game during the following videotaping. These instructions could have induced a competence set in the subjects. They would sit during the pretaping duration and imagine successful methods of demonstrating the game. Later, during videotaping, they would discover they could not fulfill the images of the previous period, would feel incompetent at the task and would have lower intrinsic motivation to play with the game.

This felt imcompetence could have been further exacerbated by the presense of the videotape equipment. The anonymity of the videotapes was emphasized several times through the instructions. However, the presense of the equipment combined with the competence related instructions could have resulted in a strong perceived external demand to perform well. This in turn would result in depressed intrinsic motivation indicators.

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Thus, given that a range of expressed intrinsic interest can be achieved using this paradigm, there are three major problems here that would have to be considered in future research. First, it is likely that the elements of control that are given to (or taken away from) the subject must not only be salient (perceived) but be relevant to the subject as well. A modified study would have to ensure that the subject sees the elements of control as relevant to the task and relevant in and of themselves. Secondly, care would have to be taken not to inadvertently induce a competence set that the subject may or may not be able to fulfill. Thirdly, a different task may have to be employed. The task would have to be one that is not only enjoyable but one that permitts a reasonable degree of success - or at least does not allow lack of success to be so clear. Barring this, more practice would have to be allowed with the labyrinth to ensure an acceptable level of performance prior to any manipulations.

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APPENDIX A

Questionnaire

INSTRUCTIONS: Please answer each of the following questions by circling one number which most accurately represents your feeling or opinion. Please answer all questions.

1. To what extent did you find the Labyrinth game interesting?

Not at all 1 2 3 4 5 6 7 8 9 Very much

2. How enjoyable did you find the Labyrinth game?

Not at all 1 2 3 4 5 6 7 8 9 Very much

3. How skillful did you feel you were at the activity?

Not at all 1 2 3 4 5 6 7 8 9 Very much

4. If you owned a Labyrinth game, to what extent do you think you would want to play with it during leisure time?

Not at all 1 2 3 4 5 6 7 8 9 Very much

5. To what extent do you think this activity would be useful in teaching manual dexterity to young children?

Not at all 1 2 3 4 5 6 7 8 9 Very much

6. How much experience have you had with this activity prior to the session today?

None at all 1 2 3 4 5 6 7 8 9 Very much

PLEASE GO ON TO THE NEXT PAGE WHEN FINISHED. DO NOT RETURN TO THIS PAGE.

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INSTRUCTIONS: On the following scales, please rate how you feel right now about the experimental activity (the game). For each pair of adjectives please circle the one number which most accurately represents your feeling or opinion. Please rate all adjective pairs.

1	Interested	1	2	3	4	5	6	7	8	9 Uninterested
2	Involved	1	2	3	4	5	6	7	8	9 Uninvolved
3	Engrossed	1	2	3	4	5	6	7	8	9 Not engrossed
4	Intrigued	1	2	3	4	5	6	7	8	9 Not Intrigued
5	Bored	1	2	3	4	5	6	7	8	9 Not bored

PLEASE GO ON TO THE NEXT PAGE WHEN FINISHED. DO NOT RETURN TO THIS PAGE.

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EXPERIMENT EVALUATION FORM

INSTRUCTIONS: The following questions are designed to determine how you feel about the experimental procedures and equipment being used in this study. Please circle a number below each item.

1. To what extent did you feel free from external pressures during the videotaping?

Not at all free 1 2 3 4 5 6 7 8 9 Very free

2. How much influence or control did you have over the amount of time you had alone prior to filming?

Very little 1 2 3 4 5 6 7 8 9 Very much

3. How much influence or control did you have over the amount of time you had for the activity during the videotaping?

Very little 1 2 3 4 5 6 7 8 9 Very much

4. In general, to what extent did you feel yourself to be in control of things during the videotaping?

Very little 1 2 3 4 5 6 7 8 9 Very much

PLEASE GO ON TO THE NEXT PAGE WHEN FINISHED. DO NOT RETURN TO THIS PAGE.

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5. How satisfied were you with the amount of control or influence you had over the experimental procedures?

Not very satisfied 1 2 3 4 5 6 7 8 9 Very satisfied

6. How satisfied are you with your activity during the videotaping?

Not very satisfied 1 2 3 4 5 6 7 8 9 Very satisfied

We are occasionally modifying this experiment, and need the following information from you in order to double check our records.

a.) Who decided how many minutes long the pretaping period was (that is, the period right before taping when you were to think of ways to most effectively demonstrate the toy)?

You( ) The Experimenter( )

b.) Who decided how long the videotaping period would be?

You( ) The Experimenter( )

PLEASE READ CAREFULLY: When you complete this page, please

a.) seal this questionnaire in the envelope

a.) knock on the door to let the experimenter know you are finished--he will have a few more short questions for you before you leave.

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APPENDIX B

Tables of Mean Values

Table 1

Mean Values for Concurrent Trials Measure

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	23.200	24.100	25.900	(24.400)
Other(low)	22.200	22.500	23.667	(22.759)
Other(high)	23.000	22.800	23.700	(23.167)
(Total)	(22.800)	(23.133)	(24.448)	

Note. In this and the following tables, means for main effects appear in columns and rows within parentheses.

Table 2

Mean Values for the Concurrent Quality Measure

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	2.154	1.982	1.862	(1.999)
Other(low)	2.209	2.336	2.351	(2.297)
Other(high)	1.907	2.214	2.079	(2.067)
(Total)	(2.090)	(2.177)	(2.089)	

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Table 3

Mean Values for Free Play Quality Measure

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	2.037	1.142	1.581	(1.587)
Other(low)	1.534	1.925	1.914	(1.787)
Other(high)	1.259	2.032	1.410	(1.567)
(Total)	(1.610)	(1.700)	(1.626)	

Table 4

Mean Values for Questionnaire Item #1, Page 1

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	7.300	6.300	5.800	(6.467)
Other(low)	7.400	7.000	7.778	(7.379)
Other(high)	6.900	5.500	7.400	(6.600)
(Total)	(7.200)	(6.267)	(6.966)	

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Table 5

Mean Values for Questionnaire Item #2, Page 1

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	7.000	5.900	5.100	(6.000)
Other(low)	6.800	6.300	8.000	(7.000)
Other(high)	6.100	5.000	5.900	(5.667)
(Total)	(6.633)	(5.733)	(6.276)	

Table 6

Mean Values for Questionnaire Item #3, Page 1

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	3.300	2.600	2.700	(2.867)
Other(low)	3.400	2.300	2.556	(2.759)
Other(high)	1.900	2.300	2.000	(2.067)
(Total)	(2.867)	(2.400)	(2.414)	

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Table 7

Mean Values for Questionnaire Item #4, Page 1

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	5.600	4.300	3.700	(4.533)
Other(low)	4.900	4.500	5.000	(4.793)
Other(high)	4.800	3.700	4.800	(4.433)
(Total)	(5.100)	(4.167)	(4.483)	

Table 8

Mean Values for Questionnaire Item #5, Page 1

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	5.900	4.300	4.500	(4.900)
Other(low)	5.000	5.900	4.889	(5.276)
Other(high)	6.400	3.700	4.400	(4.833)
(Total)	(5.767)	(4.633)	(4.586)	

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Table 9

Mean Values for Questionnaire Item #6, Page 1

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	1.400	1.400	1.800	(1.533)
Other(low)	2.200	1.100	1.111	(1.483)
Other(high)	1.700	1.500	1.300	(1.500)
(Total)	(1.767)	(1.333)	(1.414)	

Table 10

Mean Values for Questionnaire Item #1, Page 2

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	2.800	3.900	3.700	(3.467)
Other(low)	2.900	3.300	2.222	(2.828)
Other(high)	2.800	4.900	3.200	(3.633)
(Total)	(2.833)	(4.033)	(3.069)	

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Table 11

Mean Values for Questionnaire Item #2, Page 2

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	2.300	4.400	3.300	(3.333)
Other(low)	2.600	3.300	2.667	(2.862)
Other(high)	3.400	5.600	3.900	(4.300)
(Total)	(2.767)	(4.433)	(3.310)	

Table 12

Mean Values for Questionnaire Item #3, Page 2

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	3.900	4.500	4.900	(4.433)
Other(low)	3.900	4.400	3.556	(3.966)
Other(high)	4.600	5.800	4.500	(4.967)
(Total)	(4.133)	(4.900)	(4.345)	

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Table 13

Mean Values for Questionnaire Item #4, Page 2

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	2.500	4.200	4.300	(3.667)
Other(low)	3.400	3.800	2.778	(3.345)
Other(high)	3.900	5.700	3.600	(4.400)
(Total)	(3.267)	(4.567)	(3.586)	

Table 14

Mean Values for Questionnaire Item #5, Page 2

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	7.200	6.400	6.100	(6.567)
Other(low)	7.400	6.600	8.222	(7.379)
Other(high)	6.000	6.000	7.200	(6.400)
(Total)	(6.867)	(6.333)	(7.138)	

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Table 15

Mean Values for Questionnaire Item #1, Page 3

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	7.200	6.900	6.100	(6.733)
Other(low)	7.900	6.600	7.667	(7.379)
Other(high)	6.900	6.900	7.100	(6.967)
(Total)	(7.333)	(6.800)	(6.931)	

Table 16

Mean Values for Questionnaire Item #2, Page 3

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	5.100	5.200	5.900	(5.400)
Other(low)	4.200	3.900	2.000	(3.414)
Other(high)	3.300	2.200	2.500	(2.667)
(Total)	(4.200)	(3.767)	(3.517)	

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Table 17

Mean Values for Questionnaire Item #3, Page 3

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	5.300	3.000	3.000	(3.767)
Other(low)	7.900	3.000	1.889	(4.345)
Other(high)	6.300	3.700	1.800	(3.933)
(Total)	(6.500)	(3.233)	(2.241)	

Table 18

Mean Values for Questionnaire Item #4, Page 3

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	5.200	6.100	5.100	(5.467)
Other(low)	6.400	4.900	4.667	(5.345)
Other(high)	5.500	5.100	4.300	(4.967)
(Total)	(5.700)	(5.367)	(4.690)	

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Table 19

Mean Values for Questionnaire Item #5, Page 4

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	5.800	6.100	4.700	(5.533)
Other(low)	6.500	5.500	5.667	(5.897)
Other(high)	6.300	4.300	5.600	(5.400)
(Total)	(6.200)	(5.300)	(5.310)	

Table 20

Mean Values for Questionnaire Item #6, Page 4

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	3.900	4.200	3.700	(3.933)
Other(low)	4.600	3.600	3.778	(4.000)
Other(high)	4.700	2.300	3.900	(3.633)
(Total)	(4.400)	(3.367)	(3.793)	

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Table 21

Mean Values for Questionnaire Item #a, Page 4

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	0.100	0.100	0.100	(0.100)
Other(low)	1.000	0.900	0.889	(0.931)
Other(high)	0.900	0.900	0.900	(0.900)
(Total)	(0.667)	(0.633)	(0.621)	

Table 22

Mean Values for Questionnaire Item #b, Page 4

Initiation control	Duration control			
	Self	Other(low)	Other(high)	(Total)
Self	0.100	0.800	0.700	(0.533)
Other(low)	0.100	1.000	1.000	(0.690)
Other(high)	0.300	1.000	1.000	(0.767)
(Total)	(0.167)	(0.933)	(0.897)	

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APPENDIX C

ANOVA Tables

Table 1

Concurrent Trials

Source	df	MS	F	p
A (Initiation)	2	21.029	0.369	ns
B (Duration)	2	21.743	0.382	ns
AXB	4	2.537	0.045	ns
Error	80	56.990		

Table 2

Concurrent Quality

Source	df	MS	F	p
A (Initiation)	2	0.731	3.939	< .05
B (Duration)	2	0.069	0.374	ns
AXB	4	0.219	1.178	ns
Error	80	0.186		

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Table 3

Free-play Quality

Source	df	MS	F	p
A (Initiation)	2	0.457	0.266	ns
B (Duration)	2	0.063	0.037	ns
AXB	4	2.032	1.183	ns
Error	80	1.717		

Table 4

Free-play Trials

Source	df	MS	F	p
A (Initiation)	2	56.646	0.197	ns
B (Duration)	2	60.630	0.211	ns
AXB	4	759.254	2.644	< .05
Error	80	287.121		

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Table 5

Free-play Time

Source	df	MS	F	p
A (Initiation)	2	28972.941	0.672	ns
B (Duration)	2	9383.531	0.218	ns
AXB	4	86430.313	2.004	ns
Error	80	43125.785		

Table 6

Questionnaire Item #1, Page 1

Source	df	MS	F	p
A (Initiation)	2	7.425	2.010	ns
B (Duration)	2	7.118	1.927	ns
AXB	4	4.860	1.315	ns
Error	80	3.694		

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Table 7

Questionnaire Item #2, Page 1

Source	df	MS	F	p
A (Initiation)	2	15.047	3.747	< .05
B (Duration)	2	6.223	1.550	ns
AXB	4	6.848	1.705	ns
Error	80	4.016		

Table 8

Questionnaire Item #3, Page 1

Source	df	MS	F	p
A (Initiation)	2	5.545	3.207	< .05
B (Duration)	2	2.069	1.197	ns
AXB	4	1.524	0.881	ns
Error	80	1.729		

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Table 9

Questionnaire Item #4, Page 1

Source	df	MS	F	p
A (Initiation)	2	1.065	0.200	ns
B (Duration)	2	6.629	1.247	ns
AXB	4	3.682	0.693	ns
Error	80	5.316		

Table 10

Questionnaire Item #5, Page 1

Source	df	MS	F	p
A (Initiation)	2	1.584	0.251	ns
B (Duration)	2	13.116	2.081	ns
AXB	4	8.411	1.335	ns
Error	80	6.302		

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Table 11

Questionnaire Item #6, Page 1

Source	df	MS	F	p
A (Initiation)	2	0.029	0.021	ns
B (Duration)	2	1.603	1.160	ns
AXB	4	1.632	1.182	ns
Error	80	1.381		

Table 12

Questionnaire Item #1, Page 2

Source	df	MS	F	p
A (Initiation)	2	5.653	1.273	ns
B (Duration)	2	12.191	2.745	ns
AXB	4	3.207	0.722	ns
Error	80	4.441		

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Table 13

Questionnaire Item #2, Page 2

Source	df	MS	F	p
A (Initiation)	2	16.048	3.354	< .05
B (Duration)	2	21.535	4.501	< .05
AXB	4	1.988	0.415	ns
Error	80	4.785		

Table 14

Questionnaire Item #3, Page 2

Source	df	MS	F	p
A (Initiation)	2	7.636	1.426	ns
B (Duration)	2	4.742	0.886	ns
AXB	4	2.355	0.440	ns
Error	80	5.354		

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Table 15

Questionnaire Item #4, Page 2

Source	df	MS	F	p
A (Initiation)	2	8.927	2.252	ns
B (Duration)	2	13.782	3.476	< .05
AXB	4	5.845	1.474	ns
Error	80	3.964		

Table 16

Questionnaire Item #5, Page 2

Source	df	MS	F	p
A (Initiation)	2	8.641	1.926	ns
B (Duration)	2	5.362	1.195	ns
AXB	4	4.536	1.011	ns
Error	80	4.486		

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Table 17

Questionnaire Item #1, Page 3

Source	df	MS	F	p
A (Initiation)	2	3.271	0.701	ns
B (Duration)	2	2.228	0.477	ns
AXB	4	2.921	0.626	ns
Error	80	4.668		

Table 18

Questionnaire Item #2, Page 3

Source	df	MS	F	p
A (Initiation)	2	59.740	8.882	< .01
B (Duration)	2	4.028	0.599	ns
AXB	4	7.551	1.123	ns
Error	80	6.726		

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Table 19

Questionnaire Item #3, Page 3

Source	df	MS	F	p
A (Initiation)	2	1.890	0.378	ns
B (Duration)	2	147.749	29.573	< .01
AXB	4	10.565	2.115	ns
Error	80	4.996		

Table 20

Questionnaire Item #4, Page 3

Source	df	MS	F	p
A (Initiation)	2	1.962	0.335	ns
B (Duration)	2	7.867	1.344	ns
AXB	4	3.779	0.646	ns
Error	80	5.853		

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Table 21

Questionnaire Item #5, Page 4

Source	df	MS	F	p
A (Initiation)	2	1.893	0.405	ns
B (Duration)	2	7.809	1.669	ns
AXB	4	5.284	1.130	ns
Error	80	4.678		

Table 22

Questionnaire Item #6, Page 4

Source	df	MS	F	p
A (Initiation)	2	1.099	0.208	ns
B (Duration)	2	7.992	1.515	ns
AXB	4	5.098	0.966	ns
Error	80	5.276		

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Table 23

Questionnaire Item #a, Page 4

Source	df	MS	F	p
A (Initiation)	2	6.565	73.054	< .01
B (Duration)	2	0.012	0.137	ns
AXB	4	0.012	0.137	ns
Error	80	0.090		

Table 24

Questionnaire Item #b, Page 4

Source	df	MS	F	p
A (Initiation)	2	0.428	4.506	< .05
B (Duration)	2	5.565	58.575	< .01
AXB	4	0.066	0.693	ns
Error	80	0.095		

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APPENDIX D

Raw Data

Sub.[1]	Behavioral data[2]		Questionnaire data[3]
S0111	15 2.27	00 0.00 232	773871 22419 578251 00
S0211	13 2.15	05 4.00 251	994671 11219 788775 00
S0311	21 2.33	00 0.00 000	994691 11519 911775 11
S0411	18 2.56	37 2.86 449	446611 44443 611134 00
S0511	38 1.71	53 1.74 595	452344 34434 355453 00
S0611	38 1.50	37 1.73 399	871661 21317 735652 00
S0711	25 2.08	50 2.64 587	753751 22559 925421 00
S0811	14 3.07	05 3.40 087	994262 34637 999793 00
S0911	28 1.96	34 2.38 586	881681 82228 885777 00
S1011	22 1.91	29 1.62 469	875661 22447 976788 00
S0112	32 2.06	00 0.00 000	762675 34428 655633 01
S0212	26 2.35	00 0.00 016	442231 34244 524442 01
S0312	30 1.80	00 0.00 000	776681 44539 971899 01
S0412	21 2.05	00 0.00 052	573231 12567 941788 00
S0512	35 2.34	24 1.63 406	651321 66453 999982 01
S0612	21 1.43	00 0.00 004	881881 12119 381361 01
S0712	25 2.00	01 3.00 062	421111 89967 762762 01
S0812	22 2.64	27 3.37 583	995741 12329 915899 10

[1]The first two digits refer to the subject's number within a condition. The third and fourth digits refer to Pretaping and Taping levels respectively. (1=self, 2=other(low), 3=other(high))

[2]The behavioral data is grouped into concurrent and free-play data. In both groups, the first number is trials and second number is the quality measure. The third number in the free-play grouping is free-play time.

[3]Questionnaire data is in order of questions within the questionnaire.

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S0912	18	2.06	01	2.00	020	784661	44567	991875	01
S1012	11	1.09	12	1.42	559	631211	87771	311111	01
S0121	21	2.14	00	0.00	015	564562	53556	618656	10
S0221	20	1.60	00	0.00	000	882331	33738	918585	10
S0321	34	1.56	00	0.00	012	654557	54556	698744	10
S0421	16	2.00	17	2.88	338	995881	11119	959894	10
S0521	27	2.00	20	2.80	222	861361	21559	855185	11
S0621	31	2.23	03	3.33	078	886841	22329	999974	10
S0721	20	2.20	00	0.00	052	662331	42346	927776	10
S0821	26	2.38	02	1.50	144	984771	12318	879984	10
S0921	05	3.80	06	1.83	235	874266	37527	727632	10
S1021	22	2.18	01	3.00	036	752521	31266	819666	10
S0113	36	1.47	00	0.00	000	111211	42882	877732	11
S0213	17	2.47	07	2.57	208	442144	73775	393432	01
S0313	27	1.67	05	1.60	045	753431	56855	792553	00
S0413	33	2.45	21	2.81	591	973561	11119	751558	01
S0513	25	1.88	16	2.31	218	773583	32237	433533	00
S0613	26	1.46	03	2.67	106	874692	21238	881672	01
S0713	23	1.61	00	0.00	000	434121	24428	953325	01
S0813	15	1.80	47	2.66	595	872881	22228	222332	01
S0913	22	2.32	00	0.00	000	223113	88992	477775	00
S1013	35	1.49	21	1.19	239	882431	34637	941695	01
S0131	24	1.88	00	0.00	028	761741	23517	224451	11
S0231	42	1.52	77	1.73	576	962851	11449	749869	10
S0331	20	1.45	00	0.00	000	661341	53775	578743	11
S0431	20	1.80	25	2.32	346	522482	46574	681561	01
S0531	22	1.91	09	1.44	440	553471	56865	825777	10

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S0631	11	2.09	00	0.00	000	991591 15519 919199	10
S0731	30	2.37	00	0.00	036	764533 34356 826373	10
S0831	16	1.94	06	2.83	136	652275 33544 927987	10
S0931	24	1.54	10	1.40	201	771591 22219 738461	10
S1031	21	2.57	23	2.87	342	892581 21232 826756	10
S0122	15	2.87	44	2.95	584	551131 33453 511153	11
S0222	28	2.32	01	2.00	027	772251 79955 911955	11
S0322	21	2.19	00	0.00	000	972941 12249 544375	11
S0422	21	2.43	00	0.00	000	211271 83765 911251	11
S0522	20	2.05	09	1.89	273	973381 22536 955573	11
S0622	24	2.38	37	2.54	455	993892 11129 888876	11
S0722	18	2.83	07	3.43	124	664371 45756 833883	11
S0822	26	1.88	37	2.05	458	751411 33338 522211	11
S0922	18	2.50	11	2.55	292	773481 34337 481767	01
S1022	34	1.91	55	1.84	574	993971 11328 464442	11
S0123	26	2.15	41	2.32	421	552111 59959 911787	11
S0323	10	3.10	03	4.67	104	882671 23536 232333	11
S0423	21	2.76	29	2.28	522	882341 23537 811963	11
S0523	35	1.40	00	0.00	000	892581 21449 911552	11
S0623	23	2.52	12	3.25	203	773461 11229 876862	11
S0723	27	1.67	41	1.88	432	991951 11119 911195	01
S0823	33	2.45	18	2.83	191	883682 11239 623422	11
S0923	19	2.11	00	0.00	003	896621 54337 911435	11
S1023	19	3.00	00	0.00	000	992531 11119 911195	11
S0132	24	2.08	25	2.76	377	442272 77855 811451	01
S0232	20	2.55	48	2.69	480	982774 31249 466543	11
S0332	35	1.86	02	1.50	047	652241 46555 424432	11

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S0432	16	2.44	04	3.25	110	452121	99991	919991	11
S0532	35	2.34	04	1.75	112	332162	66766	545352	11
S0632	25	2.20	05	2.20	069	332441	78885	911664	11
S0732	25	2.08	06	2.17	086	962711	11259	713212	11
S0832	04	2.00	00	0.00	000	323311	59988	545343	11
S0932	18	2.28	11	4.00	388	664421	33336	911814	11
S1032	26	2.31	00	0.00	024	882631	46546	912751	11
S0133	28	1.57	00	0.00	005	531571	15329	911155	11
S0233	30	2.10	12	2.42	188	761311	46646	841881	11
S0333	21	2.19	44	2.55	597	992921	11119	525785	11
S0433	29	2.28	02	2.00	018	545221	64574	721456	11
S0533	24	1.92	00	0.00	000	971371	33746	911667	11
S0633	22	2.82	05	2.80	121	963462	13229	933353	11
S0733	16	2.00	00	0.00	000	752582	34637	711232	11
S0833	23	2.09	00	0.00	000	741721	77777	671551	01
S0933	22	1.77	03	2.33	421	882372	43447	833362	11
S1033	22	2.05	33	2.00	410	872721	23428	311457	11

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